

# TABLE OF CONTENTS

	<b>Page</b>
<b>Main points of the advice</b>	<b>1</b>
<b>1. Introduction</b>	<b>3</b>
<b>2. Objectives</b>	<b>5</b>
2.1 Main objectives	5
2.2 Specific objectives	5
<b>3. Approach of the study</b>	<b>6</b>
<b>4. Scope of the work</b>	<b>8</b>
4.1 Guiding principles	8
4.2 Procedure	10
<b>5. Organisation of the study</b>	<b>26</b>
<b>6. Monitoring</b>	<b>26</b>
<b>7. Presentation and reporting</b>	<b>27</b>
<b>Bibliography</b>	

## Appendices

1. Letter of DGIS in which the Commission is asked to submit an advisory report
2. Project information
3. Map of the Republic of Yemen
4. The sustainable development system
5. Carrying capacity, under- and over-exploitation
6. Spatial scales of environmental problems
7. Interrelations of the sustainable development system
8. Checklist for the execution of the first, second and fifth step

## MAIN POINTS OF THE ADVICE

DGIS requested the Commission for EIA to elaborate the advice for the Terms of Reference for an Environmental Profile in Shabwah Governorate, Yemen. A mixed Netherlands/Yemeni working group of the Commission prepared the advice mainly during a workshop of one week in the Netherlands.

DGIS wants to contribute to the development of an instrument which can support local authorities with the strengthening of their strategic planning. The existing environmental profiles of Yemen (Tihama, Dhamar and Al Bayda), prepared some years ago, were insufficiently used by the Yemeni and Netherlands authorities. Therefore, the need appeared for a broader development-oriented profile. In this profile sustainability is startingpoint and the other priorities of Netherlands development policy, gender aspects and poverty alleviation are included, as far as relevant.

The potential users of the studies are defined as: decision-makers, Yemeni authorities, local non-governmental organizations and readers.

The "added value" of this profile would be the incorporation of a process of integrated planning aiming at enhancing sustainable development by: (i) a participatory approach and (ii) an integrated approach. Because of the integrated nature of this profile it will be referred to as the Shabwah profile. The main objectives are defined as:

- Initiate a process that aims at enhancing commitment and consensus for strategic planning in the Governorate to foster sustainable development.
- Provide guidelines for activities by the Yemen Government and Netherlands and other donors, aiming at sustainable development in the Governorate.

Given the objectives defined, the approach of the study will emphasize the joint responsibility between the Yemeni and Netherlands partners in the study design and actual execution. In this way local coordination and planning capacity will be reinforced.

The central question of the study is defined as:

- *What are the potentials and constraints for a sustainable use of the natural resources and what are the scenarios for development with regard to sustainable development?*

The study consists of seven steps:

The first step; the study will start with an inventory of the potentials of the area.

The second step; an assessment of the problems, causes and trends per sector will be executed.

The third step; consists of a comprehensive intersectoral analysis. This analysis will firstly make use of all existing information, including fieldvisits and surveys (rapid rural appraisals) if considered necessary.

The fourth step; a report will be presented to a first workshop. The aim of this workshop is (i) ranking and selecting the most important problems that affect the environment and that hamper development in the Governorate, (ii) to select geographical (pilot) areas for further study and (iii) defining aims for development.

The fifth step; based on the outcome of the workshop the study team will execute further studies for a number of selected problems in the selected pilot areas (fifth step) in order to determine the actual potential for development in relation to each of the selected problems. Indicators will be defined to make the development of scenarios possible in the sixth step.

The sixth step; will be the development of three scenarios; a zero scenario, an ecological sustainability scenario and a sustainable development scenario. The result of step six will be a report with the two latter scenarios, for solving each of the selected problems.

The seventh step; the report will be discussed during a second workshop that will take place with the same participants as the first workshop. The aim of the workshop is to discuss scenarios and find consensus on the most desirable one. The outcome of the second workshop will be an advice to both governments on priority topics that need (project-related) support from DGIS and the Yemeni government, in order to provide sustainable solutions to the identified problems. The participants of the workshop are representatives of the relevant Yemeni and Netherlands institutions and of the local population.

## 1. INTRODUCTION

In July 1993 the Commission for Environmental Impact Assessment (Commission EIA) in the Netherlands was asked by Directorate General for International Cooperation (DGIS) to prepare an advice for the elaboration of a Terms of Reference for an Environmental Impact Assessment (EIA) in Shabwah Governorate (see appendix 3 for map). The EIA concerns the drinking water and sanitation situation in several districts in the Governorate. During a site visit the scoping mission observed that they could have benefitted from more baseline information, especially of an Environmental Profile. As other developments will take place in Shabwah Governorate, the preparation of an environmental profile that could provide essential background information was considered.

In subsequent discussions that took place in Yemen with the Environmental Protection Council and various departments within DGIS, the need appeared for a broader development-oriented profile that would at least partially include the other priorities of Netherlands development cooperation: gender aspects and poverty alleviation. These aspects aim at enhancing sustainable development, along the policy lines of DGIS.

Furthermore, it was realised that the Environmental Profiles that were developed some years ago for Tihama, Dhamar and Al Bayda regions were insufficiently used by the national authorities as part of their planning and development activities. The following deficiencies were mentioned particularly: the sectoral approach, the absence of recommendations suitable for planning purposes, and the absence of a participatory process that enhances commitment and consensus.

As DGIS wants to contribute to the development of an instrument which can support local authorities with the strengthening of their strategic planning, in a way that overcomes the deficiencies mentioned above, the Commission for EIA was asked to elaborate the advice for the Terms of Reference (ToR) for an Environmental Profile in Shabwah Governorate (see appendix 1). The "added value" would be the incorporation of a process of integrated planning aiming at enhancing sustainable development by:

- a participatory approach and;
- an integrated approach; the ecological aspects are the starting point and the social and economic aspects are included insofar as these aspects are considered to influence the present (and future sustainable) use of the natural resources (i.e. the ecological system) in a significant way.

Because of the integrated nature of this profile it will be referred to as the Shabwah profile.

The potential users of the studies can be defined as follows:

1. decision-makers, notably the Yemeni and Netherlands Governments;
2. the relevant Yemeni authorities and local Non-governmental organizations (NGOs), which will participate in the study;
3. readers, like consultants, other donors and private investors dealing with the Governorate.

The most important users will be the national and local authorities. For that reason, a participatory approach with local authorities appears essential when executing the studies for this Shabwah profile.

In a country like Yemen degradation of the environment is intricately associated with economic and social changes. In the long term sustainable use of the natural resources is a precondition to maintain the social and economic well being of the (poor) people. In the short and medium term, however, some conflicting interests between economic improvement and sustainable use of the resources are likely to occur, thereby adversely affecting the long term sustainable use of natural resources. The study will have to present scenarios for development indicating the advantages and disadvantages with regard to the ecological, social and economic sustainability in the long term.

The central question of the study is:

- *What are the potentials and constraints for a sustainable use of the natural resources and what are the scenarios for development with regard to sustainable development<sup>1</sup>?*

The composition of the working group which prepared the advice for the ToR and other project information is given in appendix 2. This advice is prepared by the working group during a workshop of one week in the Netherlands. Yemen is not visited for the preparation of the advice but all members of the working group except one know the area concerned.

### **Outline of the study**

The objectives of the study are defined in the second chapter. The approach of the study is mentioned in chapter 3. Chapter 4 deals with the scope, existing of seven steps and guiding principles of the study. The organisation of the study is explained in chapter 5. Some remarks about the contribution to monitoring are made in chapter 6. Chapter 7 deals with the preconditions of presentation / reporting.

---

1 According to Munasinghe (1993) development is sustainable if conditions are simultaneously fulfilled in three systems:  
 - ecological system, maintain the natural capital / aiming at stability of biophysical systems by preserving the resilience and productivity of natural resources to resist shocks and adapt to change;  
 - economic system, maintain the capital produced by men / aiming at a maximum flow of income that could be generated while at least maintaining the stock of assets (capital) produced by men;  
 - social system, assume a just distribution, maintain the stability of the social and cultural systems by aiming at equity within socio-economic groups (especially the elimination of poverty) and intergenerational equity (involving the rights of future generations).

## 2. OBJECTIVES

### 2.1 Main objectives

- Initiate a process that aims at enhancing commitment and consensus for strategic planning in Shabwah Governorate to foster sustainable development.
- Provide guidelines for activities by the Yemen Government and Netherlands and other donors, aiming at sustainable development in Shabwah Governorate.

### 2.2 Specific objectives

- Provide an overview of the existing natural resources and estimate the potential.
- Make an inventory of the present use of natural resources for different categories of users (differentiated by gender) and relate present use to the potential for a sustainable use.
- Identify the conflicts between the present and future needs and requirements of different interest groups (rural-rural and rural-urban) of the population.
- Provide an overview of the Yemeni policy lines, basis and legislation regarding the use of natural resources and environment (rural development and gender aspects).
- Provide a methodology leading to the selection of the most important sectors of development and propose scenarios aimed at solving the most important problems, that integrate attention for gender, poverty and environmental issues.
- Provide basic information for the assessment of proposed projects and assessments of environmental impacts.
- Suggest ideas which contribute to the strengthening of the monitoring system within existing Yemeni structures.

### 3. APPROACH OF THE STUDY

Given the objectives defined in the preceding paragraph, the approach of the study will emphasize the joint responsibility between the Yemeni and Netherlands partners in the study design and actual execution. The study is executed through a participatory approach at operational level. In this way local coordination and planning capacity will be reinforced. The study consists of seven steps, see figure 1. The study will start with an inventory of the potentials of the area (first step), followed by an assessment of the problems, causes and trends per sector (second step). The third step consists of a comprehensive intersectoral analysis. This analysis will firstly make use of all existing information and include field visits and surveys (rapid rural appraisals) if considered necessary. A report will be presented to a first workshop (fourth step), for further details see below. The aim of this workshop is (i) ranking and selecting the most important problems that effect the environment and that hamper development in the Governorate, (ii) to select geographical (pilot) areas for further study and (iii) defining of aims for development. Based on the outcome of the workshop the study team will execute further studies for a number of selected problems in the selected pilot areas (fifth step) in order to determine the expected autonomous development (zero scenario) in relation to each of the selected problems. The sixth step will be the development of scenarios. The result of step six will be a report with scenarios for solving each of the selected problems. The report will be discussed during a second workshop (seventh and last step) that will take place with the same participants as the first workshop. The aim of the workshop is to discuss scenarios and find consensus on the most desirable one. The outcome of the second workshop will be an advice to both governments on priority topics that need (project-related) support from DGIS and the Yemeni government, in order to provide sustainable development.

The profile should not be considered as a final result, but as one step in a continuous process aimed at enhancing sustainable development. The results of the study should also contribute to the development of a monitoring programme within existing Yemeni structures, by giving suggestions and ideas.

Workshops are planned in step four and seven and their set up is comparable. The workshop participants will be selected by the Coordinating Committee (for the composition and function of the Committee see chapter 5), including:

- representatives of the relevant ministries at Shabwah level;
- representatives from the NGOs and research institutions in the area;
- representatives of the local communities (including women);
- representatives of the Netherlands government and technical experts.

The workshops will have an advisory role towards the Coordinating Committee. The consultant firm plays a facilitating role mainly. The workshops as well as the reports will be conducted in English and Arabic. The workshops will be organised in Shabwah. The steps 1 - 4 and 5 - 7 will last respectively 2-3 and 6-9 months. Thus the total duration of the study is expected to span about 1 year.





## 4. SCOPE OF THE WORK

### 4.1 Guiding principles

The scope of the work is divided into seven steps, of which the sequence and the number are fixed, see figure 1. For the execution of the study the following guiding principles have to be followed in general:

1. Sustainable development system approach
2. Multilevel approach

Specific guiding principles are mentioned where they are relevant.

ad 1. The **sustainable development system approach** integrates environmental, social and economic issues, the three most vital components of the sustainable development system. This approach integrates different disciplines and relates to time, space and scale at the same time. Sustainable development takes place within the central interactive zone (shaded zone) between the environmental, the social and the economic system, see the figure at appendix 4. Implicitly, it is evident that development can not be sustainable if the conditions that belong to this place in the diagram, in one of these systems, is not fulfilled.

For this study the ecological aspects are the starting point; the social and economic aspects are included insofar as these aspects are considered to influence the present (and future sustainable) use of the natural resources (i.e. the ecological system) in a significant way.

A provisional overview of resources and their use per system is as follows:

1. *Ecological system*; natural resources
  - climate;
  - oil and minerals;
  - water availability;
  - arable land (in relation to land degradation risks, soil fertility etcetera);
  - forests (including wood for energy);
  - fish;
  - biodiversity (wildlife, medicinal plants etcetera).
2. *Economic system*; (in relation to the use of natural resources)
  - use (techniques) and management by different user groups;
  - production goals (selfsufficiency, market);
  - incorporation into the market economy;
  - division of the production sectors;
  - present and potential conflicts within and between user groups;
  - dependency of the population on the natural resources.
3. *Social system*; human resources and institutional aspects
  - demography (age structure, growth rate etcetera);
  - migration;
  - level of education (literacy);
  - health situation (influencing labour productivity);
  - cultural aspects (values, restrictions, potentials, etcetera);
  - legislation (user rights of different user groups);
  - the role of the "traditional" power structure (sheiks, tribes);
  - institutional context (governmental - non-governmental/ formal - informal {womengroups});
  - institutional capacity (in terms of services, manpower, professional skills), mandates and rights.

Enabling environment, means the setting of the study area in the national and international context (see appendix 4). The national legislation and policy regarding environmental -, economic -, and social aspects have to be described as far as relevant.

ad 2. A **multilevel approach**, which means that the study and the analysis are executed at different levels.

Three levels can be distinguished:

- macro; national Yemeni level;
- meso; usergroups and socio-economic groups (rural) and user groups and branches of the secondary and tertiary sector (urban);
- micro; households (rural) and individual enterprises (urban).

Data gathering and analysis for the distinguished steps must be executed at different levels, see below.

step 1, 2 and 3	step 5 and 6
<p><b>macro:</b> general setting of the study area, relevant aspects of national policy and legislation;</p> <p><b>meso:</b> (i) analysis of the potential of resources for user groups and (ii) analysis of urban and rural problems (iii) inventory of the institutions (governmental - non governmental / formal - informal;</p> <p><b>micro:</b> if thought necessary, rapid rural appraisals and field visits;</p>	<p><b>macro:</b> none</p> <p><b>meso:</b> (i) analyses of natural resource management of the communally owned resources and (ii) analyses of the management of urban areas by user groups and of different branches of the secondary and tertiary sector (iii) analysis of institutional capacity.</p> <p><b>micro:</b> in-depth analyses at household level by a farming system approach and analyses of the impacts of certain (urban) industries, if necessary.</p>

## 4.2

### Procedure

The steps in the procedure are illustrated by an example for every step. Water is the red line in these examples but is not worked out exhaustively however.

The **first step**

**Main activity:** - determining the actual potentials<sup>2]</sup> of the available resources.

<sup>2</sup> Actual potential (actual production capacity) is determined by the natural (optimal) potential production capacity of the natural resources (human carrying capacity) and the present use made of these resources. The potential may also be defined as the environmental utilisation space or ecospace ("milieugebruiksruimte"). The actual potential may be less than the optimal potential as a result of land degradation (e.g. due to over-exploitation), see appendix 5. Human carrying capacity (hcc) is the maximum level of exploitation of a renewable resource imposing limits on a specific type of land-use, that can be sustained without causing irreversible land degradation within a given area. Defining environmental quality of all the environmental components is necessary part in defining the (hcc). The World Health Organisation (1992) have defined standards for the quality of drinking water and air.

A distinction can be made between natural resources and human resources (gender specific) as part of respectively the ecological and social system. As regards the natural resources it is necessary to determine:

- a. the present use (primary and secondary) of the natural resources;
- b. the natural (optimal) potential (= environmental utilisation space);
- c. the relation between a. and b. and the level of degradation (for an explanation, see appendix 5);
- d. the actual potential (and potential for recovery).

This information should be presented in maps. A general division of Shabwah Governorate in land-units on basis of interpretation of satellite images must be carried out (scale 1:250.000). A selected number of land-units will be used as an input to the fourth step.

The necessary information for the first step of the study should be based primarily on an assessment of the existing information and documentation (see bibliography, monitoring systems, satellite images, a land use map is in preparation, etc.) Only if necessary information is lacking, field visits and additional surveys (rapid rural appraisal) can be carried out. It is recommended to make use of the checklist presented in appendix 8.







The **second step**:

**Main activity:** - identification and sectoral analysis of problems and related causes.

Problems and causes have to be described and must be elaborated into sectoral problem trees:

- a. the present use of the natural resources in relation to the aspects of the social and economic systems (see list paragraph 4.1);
- b. trends, utilisation of the natural resources in historical perspective and the expected future problems till the year 2010 by autonomous development.

A distinction between rural and urban problems must be made. There are two generally used manners to categorise environmental problems which might be useful (see appendix 6).

Starting point for the identification and analysis of problems is a **sectoral approach**, enabling ministries to contribute because they are sectorally organised. A distinction between productive and supportive sectors is as follows:

- |  |   |
|--|---|
| <ol style="list-style-type: none"><li>1. Productive sectors:<ul style="list-style-type: none"><li>- agriculture;</li><li>- livestock;</li><li>- fisheries;</li><li>- forestry;</li><li>- nature;</li><li>- industries<br/>(oil, mining, trade, energy);</li><li>- tourism.</li></ul></li></ol> | <ol style="list-style-type: none"><li>2. Supportive sectors<ul style="list-style-type: none"><li>- education;</li><li>- health;</li><li>- water and sanitation;</li><li>- infrastructure.</li></ul></li></ol> |
|--|---|

It is recommended to execute the first and the second step simultaneously. The necessary information for the second step of the study should, just like the first step, be based primarily on an assessment of the existing information and documentation. Only if necessary information is lacking, field visits and additional surveys (rapid rural appraisal) can be carried out. It is recommended to make use of the checklist presented in appendix 8.







The **third** step

**Main activity:** - a comprehensive intersectoral analysis of the ecological problems.

Starting point for the intersectoral analysis are the major problems and causes that were identified in relation to the ecological system (i.e. the use of the natural resources), as may have been elaborated in sectoral problem trees. In the first place, causes are indicated that are due to limited ecological potentials. In this step only those factors are included from the inventory of the social and economic systems, that are relevant in relation to the analysis of the major ecological problems. These factors are presented in their interrelationships, in an intersectoral problem tree.

The **approach** may be based on the diagram in appendix 7, which is based upon the sustainable development system as presented in appendix 4. It encompasses the three circles (ecological, social and economic system) and the enabling environment. For this profile, the ecological system is taken as the basis, and the relations with the other systems are indicated as far as relevant. Part of the diagram should be separately described for each natural resource, as indicated in appendix 7. The diagram indicates the key-factors and their interrelationships, that generally play a role in understanding and explaining environmental problems. For each key-factor, some important characteristics are indicated in appendix 7, which may serve as a guideline for a comprehensive description and priority setting of each key factor. Appendix 8 may provide some more characteristics to consider.

The **spatial scale** of the intersectoral analysis is that of the governorate, i.e. indicated are relationships with factors that may be improved at the governorate level. Factors that are of influence, but beyond the influence of the authorities (e.g. national legislation, price relations) are classified as part of the enabling environment.

The **temporal scale** of the intersectoral analysis is limited to the last 2 decades, both as regards the past and the future. The time perspective of a resource (its use and potential) may be adequately presented using the diagram as presented in appendix 5.

Both the spatial and temporal scale present limits to extent of detail that can be considered in the "chain of factors" when exploring the causes of environmental problems.

The necessary information for the execution of this step is provided by the outcome of the first and second step.



#### The fourth step

**Main activities:** priority setting of problems;

- defining aims for development;
- selection of the area for further study.

The fourth step will be executed during a workshop. Firstly, the results of the third step will be presented. The aim is to indicate the most important (present and future) problems that (will) affect the environment and that hamper sustainable development in the Governorate. The problems and causes can be visualised by using a "problemtree" (see appendix 7). The first result of the workshop is:

- a list of priority problems, their interrelations and the linkage with underlying causes with respect to potentials and the level of exploitation/ (land) degradation, which means an overview of the opportunities for sustainable use of the natural resources. The five most important problems must be selected<sup>3</sup>].

The necessary information for the execution of this part is provided by the outcome of step three.

Secondly, the members of the workshop must identify the aims of the Yemeni policy plans (national and regional) for the Shabwah governorate, as far as relevant in relation to the recorded problems. Furthermore, complementary aims for development must be defined. These aims will be used as an input to the sixth step. The result is:

- specified aims for development.

The necessary information is provided by all kind of plans and the outcome of the first part of step four.

Thirdly, the workshop has to decide about the area for further study. Therefore the third result of the workshop is:

- a selection of geographical (pilot) areas, at most four, where further studies will be conducted.

The criteria for selection of the pilot areas are:

- they must be representative for larger areas, thus enabling insight into the possibilities for the Governorate as a whole and the selected areas will therefore cover all relevant land-units;
- the availability of information;
- the severity of problems;
- the actual potentials available;
- the accessibility of the area;
- the poverty situation (relative)<sup>4</sup>].

At least one of the selected areas is a watercatchment area.

The necessary information for the execution of this part is provided by the outcome of the first three steps.

---

3 With the priority setting of problems attention is asked for, what is called **roll off mechanisms**.

The time factor is an important aspect in the development of environmental problems. Over-use of the resources can be unnoticed for a long time until "catastrophes" suddenly occur (e.g. heavy floods, salinization of the groundwater and erosion of terraces).

4 Relative poverty refers to the position of an individual or household compared with the average income in the country, such as a poverty line set at one-half of the mean income, or at the 40<sup>th</sup> percentile of the distribution (World Bank, 1993).

The **fifth step**

- Main activities:**
- execution of a detailed (problem) analysis;
  - defining and operationalising indicators.

The scope of the analysis is limited by the problems and areas selected in step four. An analyses will be executed into the severity of the (present and future) problems, their interrelations and present trends.

The necessary information for the execution of the detailed analysis will be based on:

- the intersectoral analysis executed in step three;
- analysis of the institutional capacity;
- inventory of the needs of:
  - nature, which means defining the necessary surface and environmental quality to maintain the existing natural values (plant- and animal populations);
  - men, differentiated by usergroups (rural-rural and urban-rural) and within a usergroup (distribution of the access to production means per group). A distinction must be made between basic and other needs;
- technical and socio-economic studies, like:
  - genderspecific<sup>5]</sup> farming system research;
  - resource management analyses by a community/user group approach.

Secondly, conditions (minimum) for (hard) ecological-, economic- and social sustainability must be defined. Therefore key indicators must be defined and operationalised for the most important ecological-, economic- and social aspects. These indicators will be used as an input for the assessment of solution strategies in step six.

A checklist for elements and indicators to consider during the execution of the analyses are presented in appendix 8, as much as possible specified for Shabwah Governorate.

---

5 Basic elements of a genderspecific analysis on household/ micro level: (i) division of labour between men and women in productive, care-taking and social work; (ii) patterns of expenditures and financial dependency between men and women; (iii) access to and control of, means of production and services; (iv) social mobility of men and women; (v) value patterns which influence the behaviour of men and women.



#### The sixth step

**Main activity:** - development of scenarios

The outcome of this step is the elaboration of the following scenarios:

- a. zero scenario or autonomous development, in this scenario the development of the present situation till the year 2010 will be described if no planned interventions are executed, it can be used as reference for comparison with the other scenarios. This scenario must be executed first. Then it may become clear that the autonomous development is not sustainable and interventions are necessary.
- b. ecological sustainability scenario, this scenario aims at ecological sustainability (sustainable use of the renewable resource is guaranteed) and is constructed of firstly all the aspects of the ecological system (hard ecological sustainability, which means defining bottom lines) and as far as relevant socio-economic aspects of the other systems. In this scenario all conditions for ecological sustainability are fulfilled.
- c. sustainable development scenario, aims at a sustainable development of the regional society and is constructed of aspects of all three systems (ecological, social and economic). An important aspect is defining the external factors which have an impact on the region but which can not be influenced by interventions.

#### *Development of scenarios*

For the development of scenarios b. and c. it is recommended to follow the given methodology following six stages:

##### *I Objective*

The overall objective is the sustainable development of the society of Shabwah governorate.

##### *II Problems*

The main problems must be defined. The information is provided by the detailed (problem) analysis in step five.

##### *III Aims*

Specific aims have to be defined. The necessary information is primarily provided by the outcome of step four. The aims defined during the workshop can become more specific if the recorded problems during step five are translated into aims/needs of the local population (see step five).

##### *IV Generating solution strategies*

On the basis of the defined problems (stage II) and aims (stage III) solution strategies have to be generated. These strategies consists of:

- measures to improve the existing (environmental) situation (source directed);
- mitigation measures to prevent or reduce negative impacts (effect directed);
- measures to compensate negative impacts (effect directed).

##### *V Impact assessment*

The defined solution strategies must be assessed for the ecological, economic and social aspects respectively. It is recommended to use matrices, at the x-axis the solution strategies and at the y-axis the indicators. The impact of the solution strategies at the value of the key indicators must be presented quantitatively as much as possible. The sequence of assessment (a. b. and c.) is fixed.

- a. An impact assessment following the principle of EIA for all the distinguished solution strategies must be executed. Therefore indicators must be defined and operationalised. It is recommended to start with the solution strategies related to the abiotic environment (water, soil and air) followed by the biotic natural environment ("natural" vegetation, fish and wildlife) and the man made biotic environment (rangelands, arable land and livestock).

- b. An economic impact assessment must be executed, quantitatively as far as possible for all solution strategies. Use can be made of a cost-benefit analyses (CBA).<sup>6]</sup>
- c. A gender specific social impact assessment must focus at the impact of solution strategies on the different usergroups and possible different socio-economic groups within a specified usergroup. Therefore use can be made of a distribution matrix (qualitatively) at the x-axis the solution strategies and at the y-axis the groups.

For the ecological sustainability scenario it is a condition that the scores of the EIA under a. are not negative. For the sustainability scenario the assessments a., b. and c. should be positive as much as possible.

*VI Synthesis of solution strategies for the two scenarios*

The solution strategies which are the outcome of the assessment (stage V) must be integrated into the two distinguished scenarios.

**The seventh step**

**Main activities:** balancing of the scenarios;

- advising on the priority setting of scenarios.

The study is finalised by a second workshop, where the solution strategies, which are part of the two scenarios, are balanced (e.g. multi criteria analyses) and discussed. Balancing means a comprehensive comparison of the solution strategies (output of stage V and VI of the sixth step) by using a multi criteria analyses (ranking of solution strategies according to pluses and minus = qualitative judgement).

The ranking must be executed by different parties and be presented in a matrix. The matrix is particularly useful in showing the varying and highly subjective views of different parties. An outcome might be an advice on the setting of priorities for intervention to the Coordinating Committee, see chapter 5.

For this step no example considering water is presented.

---

6 The application of a cost-benefit analysis in relation to impact assessment is described by M.J.F. van Pelt (1994).





## 5. ORGANISATION OF THE STUDY

The study will be supervised by a "coordinating committee" consisting of representatives of the Environmental Protection Council (EPC), the Governor Office and the Netherlands Embassy. Before the study starts this Committee will meet to discuss the action plan and the time frame, to be elaborated based on the ToR, and seeing to it that both are respected. Furthermore, it will indicate who is to participate in the two workshops, and based on the outcome of the workshops which areas and problems will be studied in the fifth step.

The study team will consist of Netherlands and Yemeni experts. They are responsible under the guidance of the Teamleader, appointed by the consulting firm. They will prepare the two documents for the workshops and the final profile at the end of the study period. An office will be made available by the Governorate, preferably within the department of planning. In this way data collection, monitoring and updating will be assured by the relevant authorities, following completion of the profile. Furthermore, the existing information at Governorate level within the various ministries, will become easily available for the study-team.

The study-team should have a multidisciplinary composition of about 5-6 persons, coordinated by the team leader, and will be genderbalanced as far as possible. The following fields should be covered:

- Agriculture and Livestock;
- Water supply and Sanitation, including Geo-hydrology;
- Ecology;
- Social Science, including Gender;
- Management in relation to institutions and environmental aspects;
- Rural Economy;
- Fisheries, on a short term base;

All experts should have gender experience.

## 6. MONITORING

The study will contribute to the implementation of an effective planning instrument in Shabwah Governorate. To make long term planning possible the information presented in the profile has to be updated every 5-10 years. Therefore the data in the profile must be presented in such a way (including the method of collection and processing) that comparable updating in future is guaranteed. The study will yield suggestions for future updating and how this can be imbedded in existing institutions.

## 7. PRESENTATION AND REPORTING

The results of the study as a whole have to be presented into one final report, the Shabwah profile. The Commission recommends:

The final report consists of three parts in one volume:

1. General description of Shabwah Governorate;

- ecological -, economic- and social aspects (landclassification, thematic maps including land-use maps and demographic aspects);
  - description of the enabling environment.
2. Analysis of rural and urban problems (land-units, usergroups {problems, potential}).
  3. Perspectives for sustainable development, presenting scenarios.
    - problems and solution strategies are well elaborated;
    - the scenarios have to be presented clearly on maps and / or schemes (matrix);
    - a summary has to be included;
    - it has to be made clear which information is lacking and in what way this influenced the validity of the analysis.

All reports will be available in English and Arabic. The final Shabwah profile and maps will also be supplied on diskette.